

# VA/DoD CLINICAL PRACTICE GUIDELINE FOR THE MANAGEMENT OF STROKE REHABILITATION

## Guideline Summary

**RECOMMENDATIONS WITH THE HIGHEST EVIDENCE:** The highest evidence for recommendations is A, defined as “a strong recommendation based on randomized controlled trials that the intervention is always indicated and acceptable.”

The following practices are strongly recommended based on evidence reviews:

1. Post-acute stroke care should be delivered in a setting where rehabilitation care is formally coordinated and organized. [R=A] pp. 2, 16 & 19
2. Assess stroke severity and recovery using the National Institutes of Health Stroke Scale (NIHSS) at the time of presentation/hospital admission, or at least within the first 24 hours following presentation. [R=A] pg. 3 & 9
3. Rehabilitation therapy should start as early as possible, once medical stability is reached. [R=A] pg. 3
4. Subcutaneous low-dose unfractionated heparin (LDUH) (5000 units BID, unless contraindicated) should be used to prevent DVT/pulmonary embolism (PE) for patients with ischemic stroke and impaired mobility. [R=A] pg. 3
5. Patients with a symptomatic carotid stenosis of (70 - 99 percent), who are surgical candidates and have a life expectancy of over 2 years, should undergo carotid endarterectomy (CEA) if the surgical morbidity and mortality is under 5 percent at the treating center. [R=A] pg. 10
6. Patients with atrial fibrillation, mechanical heart valves, mural thrombi, or other high risk sources of cardio-genic emboli should be treated with warfarin at a target INR of 2.5, range 2.0 to 3.0, if they are likely to be compliant with the required monitoring and are not at high risk for bleeding complications. [R=A] pg. 10
7. Patients with non-cardioembolic ischemic stroke should receive antiplatelet therapy after stroke if there is no bleeding contraindication. [R=A] pg. 10
8. Treatment of hypertension should be instituted after the acute period in patients who have consistently elevated blood pressure. Even borderline hypertension conveys an increased stroke risk. Target blood pressure should be in accordance with the VA/DoD Clinical Practice Guideline for the Diagnosis and Management of Hypertension in the Primary Care Setting. Angiotensin-converting enzyme (ACE) inhibitors should be considered as an antihypertensive agent, and may have benefit in secondary stroke prevention, even in patients without hypertension. [R=A] pg. 10
9. Patients who have had an ischemic stroke should be treated for hypercholesterolemia according to the VA/DoD Clinical Practice Guideline for Dyslipidemia. The use of HMG CoA Reductase Inhibitors (“statins”) has been shown to reduce incidence of stroke by 23 to 50 percent in patients with cardiac disease, even in the absence of elevated total or low-density lipoprotein (LDL) cholesterol. Use of these agents should be considered in patients with hypercholesterolemia and ischemic stroke. [R=A] pg. 10
10. Every patient participates in a secondary prevention program (see Annotation D). [R=A] pg. 18
11. All patients should be evaluated and treated by the speech and language pathologist (SLP) for residual communication difficulties (i.e., speaking, listening, reading, writing, and pragmatics). [R=A] pg. 21
12. Patients should be assessed for cognitive deficits and be given cognitive re-training, if any of the following conditions are present: Attention deficits [R=A] pg. 24
13. Patients with a diagnosed depressive disorder or with severe, persistent or troublesome tearfulness should be given a trial of antidepressant medication, if no contraindication exists. [R=A] pg. 25
14. Outpatient rehabilitation services be continued in the setting where they can most appropriately and effectively be carried out. This is based on medical status, function, social support, and access to care. [R=A] pg 28

## KEY ELEMENTS

- The primary goal of rehabilitation is to **prevent complications, minimize impairments, and maximize function.**
- Secondary prevention is fundamental to **preventing stroke recurrence.**
- **Early** assessment and intervention is critical to optimize rehabilitation.
- **Standardized** evaluations and valid assessment tools are essential to the development of a comprehensive treatment plan.
- Evidence-based interventions should be based on **functional goals.**
- Every candidate for rehabilitation should have access to an **experienced and coordinated** rehabilitation team to ensure optimal outcome.
- **The patient and family and/or caregiver** are essential members of the rehabilitation team.
- **Patient and family education** improves informed decision-making, social adjustment, and maintenance of rehabilitation gains.
- The **rehabilitation** team should utilize **community resources for community reintegration.**
- **Ongoing** medical management of risk factors and co-morbidities is essential to ensure survival.

## EVIDENCE-BASED GRADING OF THE RECOMMENDATIONS

The recommendations cited in the Guideline Summary are followed by the Working Group's overall recommendation (R) grade (e.g., **R=B**).

<b>Grade (R)</b>	<b>Definition</b>
A	A strong recommendation based on randomized controlled trials that the intervention is always indicated and acceptable.
B	A recommendation that the intervention may be useful/effective.
C	A recommendation that the intervention may be considered.
D	A recommendation that a procedure may be considered not useful/effective, or may be harmful.
I	Insufficient evidence to recommend for or against – the clinician will use clinical judgment.

## THE PROVISION OF REHABILITATION CARE

### Organization of Post-Acute Stroke Rehabilitation Care

Stroke rehabilitation begins during the acute hospitalization, as soon as the diagnosis of stroke is established and life-threatening problems are under control. The highest priorities during this early phase are to prevent a recurrent stroke and complications, ensure proper management of general health functions, mobilize the patient, encourage resumption of self-care activities, and provide emotional support to the patient and family. Following the “acute” phase of stroke care, the focus of care turns to assessment and recovery of any residual physical and cognitive deficits, as well as compensation for residual impairment.

Over the years, the organization and delivery of stroke care has taken many forms. With the growth of physical medicine, occupational therapy, and physical therapy, varying therapeutics and treatment settings have evolved. Assessment of the effect of stroke care organization and a comparison of settings are difficult due to the extreme variability of organizational settings. For example, on the extreme, rehabilitation services can be provided in an outpatient setting—one hour per day, three days per week, by one therapist. At the other end of the structural continuum, rehabilitation services can be provided in a rehabilitation hospital setting—five hours per day, seven days per week, by a team made up of several clinicians.

The Agency for Healthcare Policy and Research (AHCPR) Guideline for Post-Stroke Rehabilitation (1995) has concluded, “A considerable body of evidence, mainly from countries in Western Europe, indicates that better clinical outcomes are achieved when patients with acute stroke are treated in a setting that provides coordinated, multidisciplinary stroke-related evaluation and services. Skilled staff, better organization of services, and earlier implementation of rehabilitation interventions appear to be important components.”

The VA/DoD Working Group reviewed several studies and trials addressing the question of organization of care. Although the reviews and trials make it clear that rehabilitation is a dominant component of organized services, it is not possible to specify precise standards and protocols for specific types of specialized units for stroke patients. Their limitations stem from imperfections in the way the reviews and trials controlled for

differences in the structure and content of multidisciplinary/standard care programs, the period defined as acute post-stroke care, staff experience and staff mix, and patient needs for rehabilitation therapy (i.e., stroke severity and type).

### RECOMMENDATIONS

1. Better clinical outcomes are achieved when post-acute stroke patients, who are candidates for rehabilitation, receive coordinated, multidisciplinary evaluation and intervention.
  - Post-acute stroke care should be delivered in a setting where rehabilitation care is formally coordinated and organized. [R=A]
  - Post-acute care should be delivered by a variety of treatment disciplines, experienced in providing post-stroke care, to ensure consistency and reduce the risk of complications. [R=I]
  - The multidisciplinary team may consist of a physician, nurse, physical therapist, occupational therapist, kinesiotherapist, speech and language pathologist, psychologist, recreational therapist, patient, and family/caregivers. [R=I]
2. If an organized rehabilitation team is not available in the facility, patients with moderate or severe symptoms should be offered a referral to a facility with such a team, or a physician or rehabilitation specialist with some experience in stroke should be involved in the patient's care.
3. An organized team approach should also be continued in coordinating the outpatient or home-based rehabilitation care. Community resources for stroke rehabilitation services that include an organized team should be identified and provided to patients and families/caregivers.

### The Use Of Standardized Assessments

Comprehensive assessment of patients with stroke is necessary for appropriate clinical management and evaluation of outcomes for quality management and research. The AHCPR Post-Stroke Rehabilitation Guideline (1995) recommends the use of well-validated, standardized instruments in evaluating stroke patients. These instruments help to ensure reliable documentation of the patient's neurological conditions, levels of

disability, functional independence, family support, quality of life, and progress over time.

## RECOMMENDATIONS

1. Strongly recommend to assess the stroke recovery using the National Institutes of Health Stroke Scale (NIHSS) at the time of presentation/hospital admission, or at least within the first 24 hours following presentation. [R=A]
2. Recommend that all patients should be screened for depression and motor, sensory, cognitive, communication, and swallowing deficits by appropriately trained clinicians, using standardized and valid screening tools. [R=C]
3. If depression and motor, sensory, cognitive, communication, and swallowing deficits are found, all patients should be formally assessed by the appropriate clinician from the coordinated rehabilitation team. [R=C]
4. Recommend that the clinician use standardized, valid assessments to evaluate the patient's stroke-related impairments and functional status and participation in community and social activities. [R=C]
5. Recommend that the standardized assessment results be used to assess probability of outcome, determine the appropriate level of care, and develop interventions.
6. Recommend that the assessment findings should be shared and the expected outcomes be discussed with the patient and family/caregivers.

## Intensity/Duration Of Therapy

There has been controversy in the past regarding the timing of initiation of therapy and intensity of therapy required for the acute stroke patient to gain maximum functional outcome. While patients who are medically unstable are considered not suitable for any rehabilitation program, studies generally support early mobilization of the patient with an acute stroke to prevent deep vein thrombosis (DVT), skin breakdown, contracture formation, constipation, and pneumonia. Early therapy initiation, including range-of-motion exercises and physiologically sound changes of bed position on the day of admission, followed by a progressive increase in the level of activity should be

provided as soon as medically tolerated. Early mobilization should also include encouraging the patient to resume self-care activities and socialization.

The physical demands of rehabilitation are substantial. The patient's tolerance for therapy will depend on several factors including the severity of the stroke, medical stability, mental status, and level of function.

## RECOMMENDATIONS

1. Strongly recommend that rehabilitation therapy should start as early as possible, once medical stability is reached. [R=A]
2. Recommend that the patient receives as much therapy as "needed" to adapt, recover, and/or reestablish the premorbid or optimal level of functional independence. [R=B]

## Patient's Family And Caregivers

With the changes that have occurred in healthcare in the last decade, family members have become an integral part of the long-term care picture. Provision of long-term care can place family members under significant emotional, financial, and physical stress. Though a number of services are available to families/caregivers, the dissemination of this information is sometimes poor. As a result, many families are not able to take advantage of the resources available for respite, support groups, and financial aid. The family member/caregiver's quality of life may be improved if he/she is educated about potential sources of stress and resources. However, education alone has not been found to be sufficient to improve the caregiver's quality of life. Research in this area is limited and of variable quality.

## RECOMMENDATIONS

1. The family/caregiver of the stroke patient should be involved in decision making and treatment planning as early as possible, if available, and throughout the duration of the rehabilitation process.
2. The provider must be alert to the stress on the family/caregiver, specifically recognizing the stress associated with impairments (e.g., cognitive loss, urinary incontinence, and personality changes) and providing support, as indicated.
3. Acute care hospitals and rehabilitation facilities should maintain up-to-date information on

community resources at the local and national level, provide this information to the stroke patient and families/caregivers, and offer assistance in obtaining needed services.

4. The patient and caregivers should have their psychosocial and support needs reviewed on a regular basis, by a social worker or appropriate healthcare worker, to minimize caregiver distress.

### **Patient And Family/Caregiver Education**

The patient and family/caregivers should be given information and provided with an opportunity to learn about the causes and consequences of stroke, potential complications, and the goals, process, and prognosis of rehabilitation.

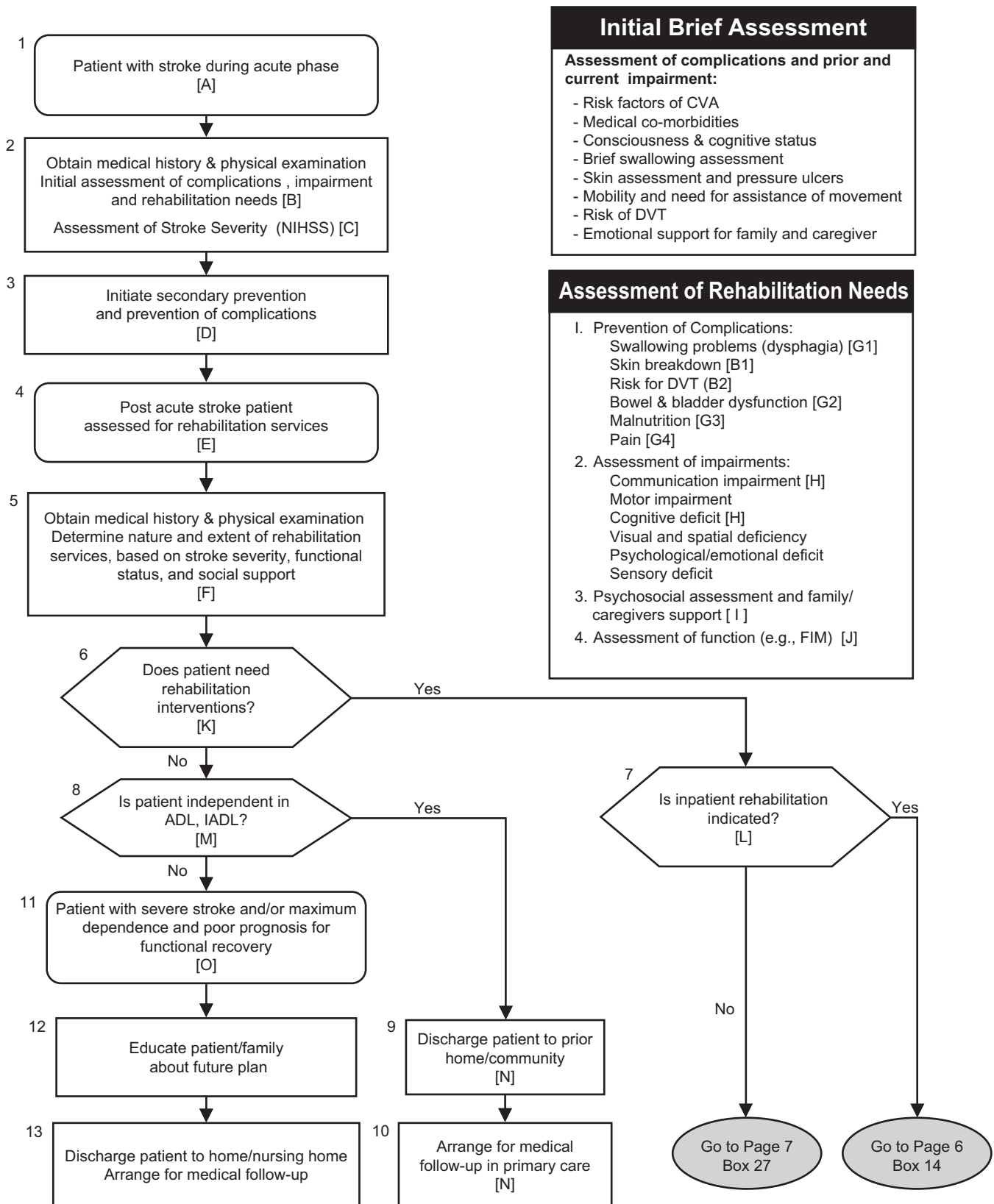
### **RECOMMENDATIONS**

1. Recommend that patient and family/caregiver education should be provided in an interactive and written format. **[R=B]**
2. Consider identifying a specific team member to be responsible for providing information to the patient and family/caregiver about the nature of the stroke, stroke management rehabilitation and outcome expectations, and their roles in the rehabilitation process. **[R=C]**
3. The family conference may be considered as a useful means of information dissemination. **[R=C]**
4. Recommend that patient and family education should be documented in the patient's medical record to prevent the occurrence of duplicate or conflicting information from different disciplines. **[R=C]**



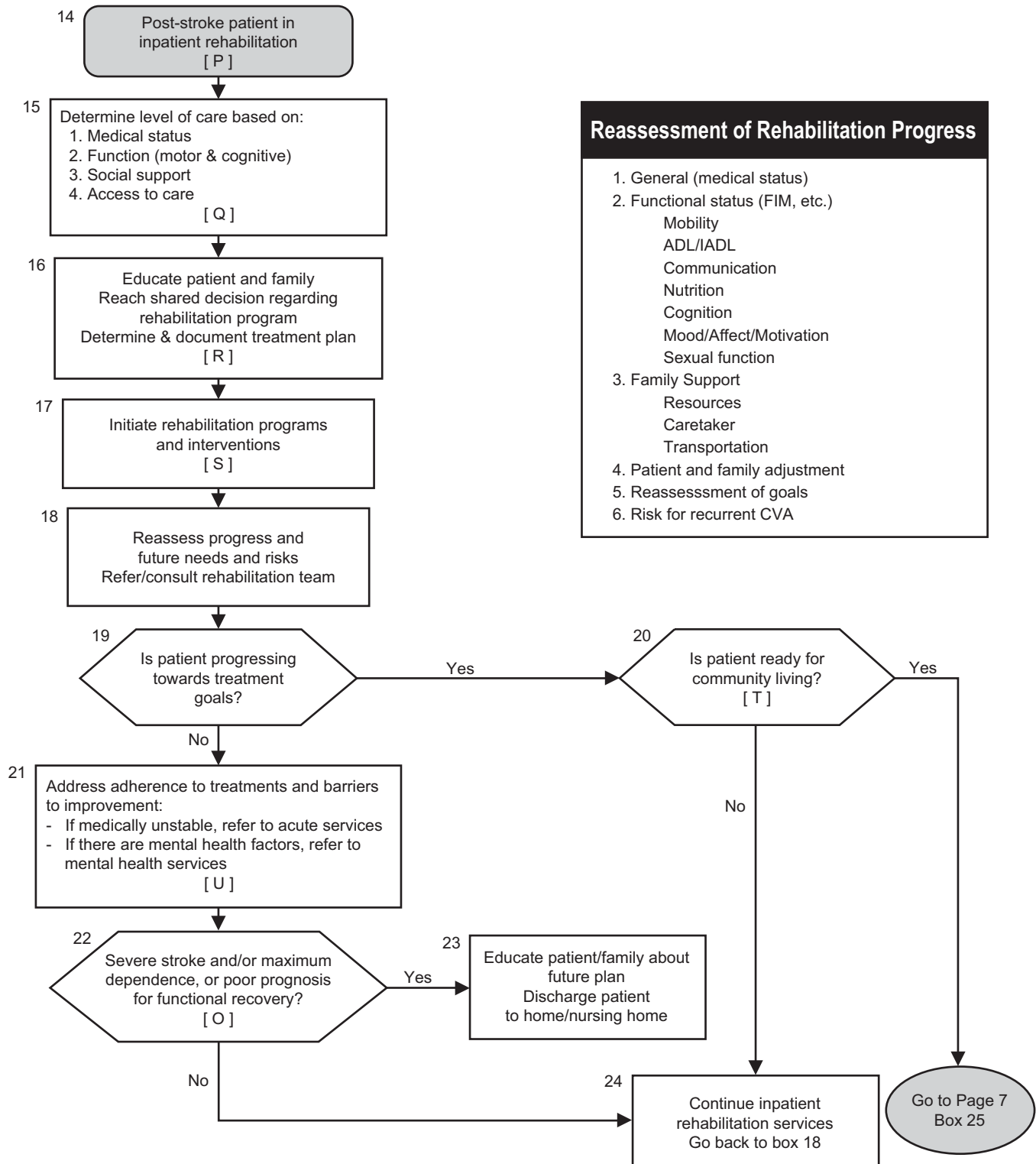
# Clinical Practice Guideline for the Management of Stroke Rehabilitation Assessment

# A



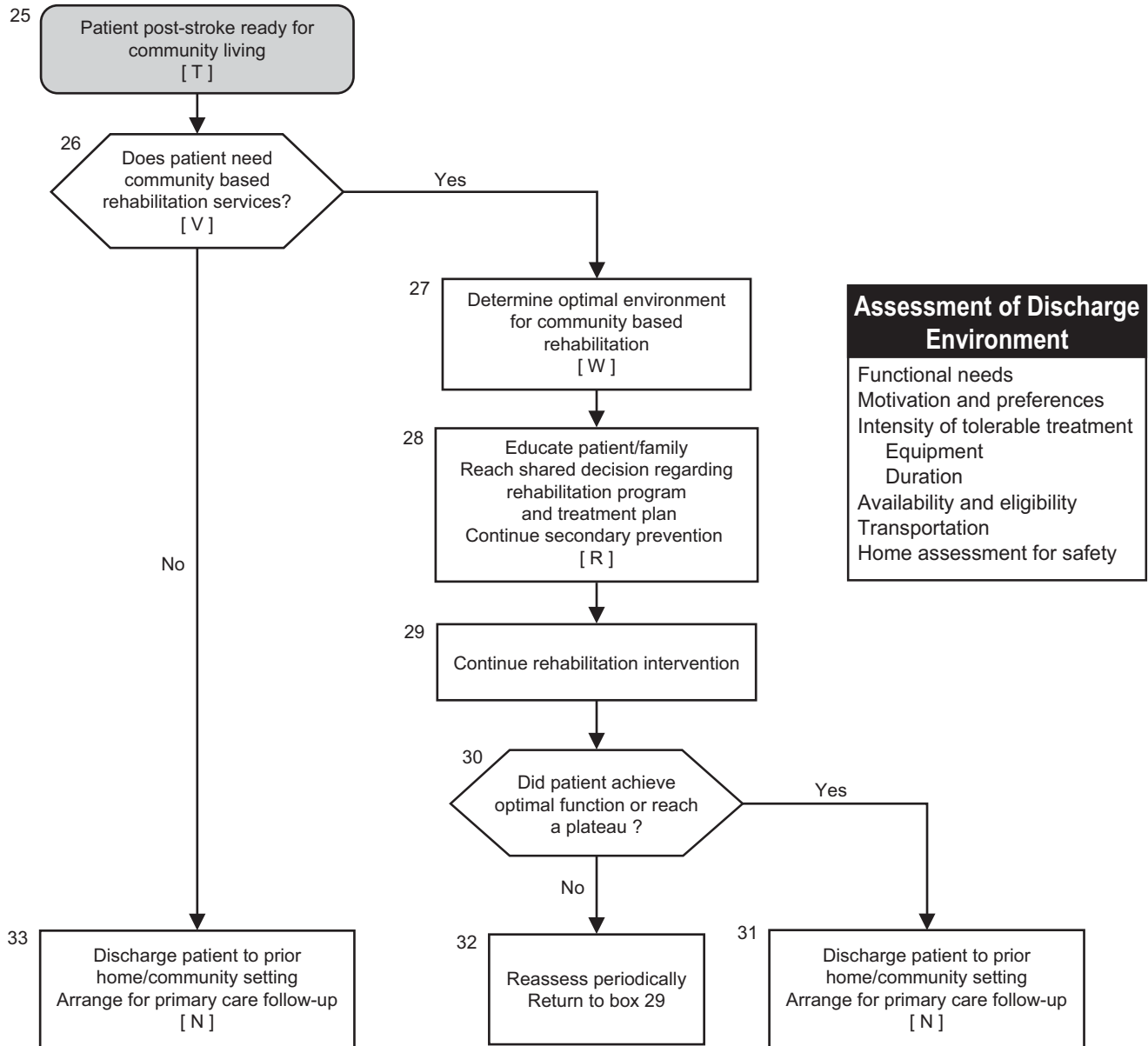
# Clinical Practice Guideline for the Management of Stroke Rehabilitation Inpatient Rehabilitation

# B



# Clinical Practice Guideline for the Management of Stroke Rehabilitation Community Based Rehabilitation

C





## ANNOTATIONS

### REHABILITATION DURING THE ACUTE PHASE

#### A. PATIENT WITH STROKE DURING ACUTE PHASE

AHCPR (1995) defines “acute care” as:

*The period of time immediately following the onset of an acute stroke. A full-service hospital where patients with an acute stroke are treated either in a medical service or in a specialized stroke unit, and where rehabilitation interventions are normally begun during the acute phase.*

Because of the nature of the neurological problems and the propensity for complications, most patients with acute ischemic stroke are admitted to a hospital. Outcome can be improved if a patient is admitted to a facility that specializes in the care of stroke. The goals of early supportive care after admission to the hospital are to:

1. Observe changes in the patient's condition that might prompt different medical or surgical interventions.
2. Facilitate medical and surgical measures aimed at improving outcome after stroke.
3. Institute measures to prevent subacute complications.
4. Begin planning for therapies to prevent recurrent stroke.
5. Begin efforts to restore neurological function through rehabilitation or other techniques.

After stabilization of the patient's condition the following can be initiated, when appropriate: rehabilitation, measures to prevent long-term complications, chronic therapies to lessen the likelihood of recurrent stroke, family support, and treatment of depression.

#### B. OBTAIN MEDICAL HISTORY AND PHYSICAL EXAMINATION. INITIAL ASSESSMENT OF COMPLICATIONS, IMPAIRMENT, AND REHABILITATION NEEDS

Stroke rehabilitation begins during the acute hospitalization, as soon as the diagnosis of stroke is established and life-threatening problems are controlled. The highest priorities are to prevent recurrence of stroke and complications and begin mobilization.

#### RECOMMENDATIONS

1. The National Institutes of Health Stroke Scale (NIHSS) should be used to assess severity of stroke in the initial stages as a predictor of mortality and long-term outcome (see Annotation C).
2. The initial assessment should include a complete history and physical examination, with special emphasis on the following:
  - Risk factors for stroke recurrence
  - Medical co-morbidities
  - Level of consciousness and cognitive status
  - Brief swallowing assessment
  - Skin assessment and risk for pressure ulcers (see Annotation B-1)
  - Bowel and bladder function
  - Mobility, with respect to the patient's needs for assistance in movement
  - Risk of deep vein thrombosis (DVT) (see Annotation B-2)
  - History of previous antiplatelet or anticoagulation use, especially at the time of stroke
  - Emotional support for the family and caregiver

#### B-1 Risk for Skin Breakdown

Pressure ulcers affect approximately 9 percent of all hospitalized patients and 23 percent of all nursing home patients. This condition can be difficult and costly to treat and often results in pain, disfigurement, and prolonged hospitalization. It is crucial that healthcare personnel work collaboratively to prevent skin breakdown. Patients at highest risk for skin breakdown may have: 1) dependence in mobility, 2) diabetes, 3) peripheral vascular disease, 4) urinary incontinence, 5) lower body mass index, and 5) end stage disease.

#### RECOMMENDATIONS

1. Recommend that a thorough assessment of skin integrity should be completed upon admission and monitored, at least daily, thereafter. [R=C]
2. Recommend the use of proper positioning, turning, and transferring techniques and judicious use of barrier sprays, lubricants, special mattresses, and

protective dressings and padding to avoid skin injury due to friction or excessive pressure. [R=C]

## **B-2 Risk for Deep Vein Thrombosis (DVT)**

There are several approaches to preventing deep venous thrombosis (DVT) in stroke patients. Current practices include anticoagulation, intermittent pneumatic compression, compression stockings, and early mobilization. Walking as little as 50 feet per day, with or without assistance, significantly decreases the incidence of DVT post-stroke.

### **RECOMMENDATIONS**

1. Recommend that all patients be mobilized, as soon as possible (the act of getting a patient to move in the bed, sit up, stand, and eventually walk). [R=C]
2. Strongly recommend the use of subcutaneous low-dose unfractionated heparin (LDUH) (5000 units BID, unless contraindicated) to prevent DVT/pulmonary embolism (PE) for patients with ischemic stroke and impaired mobility. [R=A] Low molecular weight heparin (LMWH) or heparinoids may be used as an alternative to LDUH, especially in patients with a history of heparin-related side effects (such as thrombocytopenia). [R=C]
3. Consider the use of graduated compression stockings or an intermittent pneumatic compression machine as an adjunct to anticoagulation, or as an alternative to anticoagulation for patients with intracerebral hemorrhagic or for patients in whom anticoagulation is contraindicated. [R=B]

## **C. ASSESSMENT OF STROKE SEVERITY (NIHSS)**

The National Institutes of Health Stroke Scale (NIHSS) is a standardized, validated instrument that assesses severity of neurological impairment after stroke (refer to Appendix C – NIHSS in the full guideline). It is designed so that virtually any stroke will register some abnormality on the scale. The scale has an administration time of 5 to 10 minutes. The NIHSS score is based solely on examination and requires no historical information or contributions from surrogates. It can be administered at any stage by any trained clinician.

The original 11 items of the NIHSS do not test distal upper extremity weakness, which is more common in

stroke patients than proximal arm weakness. An additional item examining finger extension is often added to the NIHSS. Although not contributing to the total NIHSS score, this item should be recorded as part of the NIHSS assessment.

### **RECOMMENDATIONS**

1. Strongly recommend that the patient be assessed for stroke severity using the NIHSS at the time of presentation/hospital admission, or at least within the first 24 hours following presentation. [R=A]
2. Strongly recommend that all professionals involved in any aspect of the stroke care be trained and certified to perform the NIHSS.
3. Recommend that patients should be reassessed using the NIHSS at the time of acute care discharge.
4. Recommend that if the patient is transferred to rehabilitation and there are no NIHSS scores in the record, the rehabilitation team should complete an NIHSS.

## **D. INITIATE SECONDARY PREVENTION AND PREVENTION OF COMPLICATIONS**

Following a stroke, patients are at increased risk for additional cerebrovascular events. Specific therapy and risk factor reduction must be an integral part of any plan for stroke rehabilitation and recovery. The need for secondary prevention of stroke is lifelong and continues beyond the period of rehabilitation.

The extant data are clear on certain issues (i.e., the need for treatment of hypertension, use of warfarin in atrial fibrillation, and benefits of antiplatelet therapy); comparative data between interventions and distinction between benefits of individual drugs versus class effects will require further study. Therefore, these recommendations will need to be revised as additional data become available. Additionally, the majority of data concerns prevention of further ischemic events. In cases of hemorrhagic stroke, hypertension and hypercholesterolemia should still be addressed. Refer to Appendix A – Antiplatelet Pharmacotherapy in the full guideline for criteria for choosing antiplatelet therapy.

## RECOMMENDATIONS

1. Strongly recommend that patients with a symptomatic carotid stenosis of (70 - 99 percent), who are surgical candidates and have a life expectancy of over 2 years, should undergo carotid endarterectomy (CEA) if the surgical morbidity and mortality is under 5 percent at the treating center. **[R=A]** CEA may be considered in selected patients with carotid stenosis of 50 to 69 percent (number-needed-to-treat to prevent one stroke over 5 years=15). Antiplatelet therapy should be instituted after post-operative recovery from CEA.
2. Strongly recommend that patients with atrial fibrillation, mechanical heart valves, mural thrombi, or other high risk sources of cardiogenic emboli should be treated with warfarin at a target INR of 2.5, range 2.0 to 3.0, if they are likely to be compliant with the required monitoring and are not at high-risk for bleeding complications. **[R=A]** In cardioembolic patients who have had a large stroke, anticoagulation should not be started for 7 to 10 days due to the risk of cerebral hemorrhage. In non-cardioembolic ischemic stroke, warfarin has not been shown to be more effective than aspirin.
3. Strongly recommend that patients with non-cardioembolic ischemic stroke should receive antiplatelet therapy after stroke if there is no bleeding contraindication. **[R=A]** Aspirin at a dose of 81 mg – 325 mg is cost-effective, and is the usual first-line agent. Clopidogrel at 75 mg/day, and the combination of 200 mg extended release dipyridamole with 25 mg of aspirin taken twice a day are acceptable alternatives to aspirin, and may provide a greater degree of risk reduction than aspirin albeit at a higher cost.
4. Strongly recommend that patients having a stroke while on aspirin be considered for alternative antiplatelet agents (refer to Appendix A- Antiplatelet Pharmacotherapy in the full guideline and also at <http://www.vapbm.org/PBM/criteria.htm>).
5. Strongly recommend that treatment of hypertension should be instituted after the acute period in patients who have consistently elevated blood pressure. Even borderline hypertension conveys an increased stroke risk. Target blood pressure should be in accordance with the VA/DoD Clinical Practice Guideline for the

Diagnosis and Management of Hypertension in the Primary Care Setting. Several drugs have been studied and shown to be effective in stroke prevention such as ACE inhibitors, beta-blockers, and thiazide diuretics. The ACE inhibitors, ramipril and perindopril, may exhibit beneficial effects on stroke prevention independent of blood pressure reduction. Control of hypertension remains an essential cornerstone for stroke prevention.**[R=A]**

Avoid sudden or excessive drops in blood pressure which could exacerbate cerebral hypoperfusion (especially in the acute phase). Do not use fast-acting antihypertensive drugs, which could drop blood pressure too much and too fast.

6. Strongly recommend that patients who have had an ischemic stroke be treated for hypercholesterolemia according to the VA/DoD Clinical Practice Guideline for Dyslipidemia. **[R=A]**
7. Recommend that all patients after stroke should be counseled about smoking cessation, participation in a regular exercise program (as permitted by the patient's physical limitations and general medical condition), maintaining a body-mass index within the desirable range, and avoidance of heavy alcohol use (refer to the VA/DoD Clinical Practice Guideline for Management of Substance Use Disorders in the Primary Care Setting and the VA/DoD Clinical Practice Guideline To Promote Tobacco Use Cessation in the Primary Care Setting). **[R=B]**
8. Ongoing monitoring of anticoagulant or antiplatelet therapy, treatment of hypertension and hypercholesterolemia, and other secondary prevention strategies is a lifelong need of patients after stroke and should normally be performed by the patient's primary healthcare provider.

**Table 1: Selection of Antiplatelet Agent for Secondary Prevention**

Condition	Preferred Agent	Dose	Alternative	Dose
Atrial fibrillation	Warfarin <sup>(a)</sup>	Dose adjusted to maintain INR 2.0 -3.0 (target INR 2.5)	Aspirin <sup>(b)</sup>	–
Primary prevention	Aspirin	81 mg – 325 mg	Clopidogrel <sup>(c)</sup>	75 mg PO QD
Secondary prevention	Aspirin	81 mg – 325 mg	Clopidogrel <sup>(d)</sup> Aspirin/extended release dipyridamole <sup>(e)</sup>	75 mg PO QD 25 mg/200 mg PO BID

<sup>(a)</sup>In patients with atrial fibrillation, warfarin is recommended for all patients over the age of 75 (unless a specific contraindication exists), and in patients of any age with a prior embolic event or with known risk factors for stroke. Patients with lone atrial fibrillation may differ in therapy. Those under 65 years require no mandatory therapy, but aspirin is optional. For those patients age 66 to 75 years, aspirin is recommended and warfarin is optional.

<sup>(b)</sup>Patients who experience recurrent symptoms of cerebral ischemia on appropriate warfarin therapy, consideration should be given to adding aspirin 80 mg daily.

<sup>(c)</sup>Patients with aspirin allergy, recent history of active gastrointestinal bleeding, or other contraindications to aspirin therapy.

<sup>(d)</sup>Those with a contraindication to aspirin therapy

<sup>(e)</sup>Patients who experience recurrent cerebral ischemia. Alternatively, aspirin/extended release dipyridamole may be used as the first-line therapy in selected high-risk patients.

## POST-STROKE REHABILITATION

### E. POST-ACUTE STROKE PATIENT ASSESSED FOR REHABILITATION SERVICES

Post-acute stroke is defined as the period of time immediately following discharge from acute care. The stroke patient has achieved medical stability and the focus of care now becomes rehabilitation. Stroke rehabilitation following discharge from acute care can be conducted in inpatient rehabilitation hospitals or rehabilitation units in acute care hospitals, nursing facilities, the patient's home, or outpatient facilities. Some patients may recover from the acute phase with no need for rehabilitation services.

#### **Inpatient rehabilitation:**

*Rehabilitation performed during an inpatient stay in a freestanding rehabilitation hospital or a rehabilitation unit of an acute care hospital. The term **inpatient** is also used to refer generically to programs where the patient is in residence during treatment, whether in an acute care hospital, a rehabilitation hospital, or a nursing facility.*

#### **Nursing facility rehabilitation:**

*Rehabilitation performed during a stay in a nursing facility. Nursing facilities vary widely in their rehabilitation capabilities, ranging from maintenance care to comprehensive and intense rehabilitation programs.*

#### **Outpatient rehabilitation:**

*Rehabilitation performed in an outpatient facility that is either freestanding or attached to an acute care or rehabilitation hospital. Day hospital care is a subset of outpatient rehabilitation in which the patient spends a major part of the day in an outpatient rehabilitation facility.*

#### **Home-based rehabilitation:**

*A rehabilitation program provided in the patient's place of residence.*

### F. OBTAIN MEDICAL HISTORY AND PHYSICAL EXAMINATION. DETERMINE NATURE AND EXTENT OF REHABILITATION SERVICES BASED ON STROKE SEVERITY, FUNCTIONAL STATUS, AND SOCIAL SUPPORT

A thorough history and physical should be performed by the rehabilitation physician. The National Institute of Health Stroke Scale (NIHSS) score should be obtained at this time, if not previously determined by the referring team. The history, physical, and NIHSS score provides the framework to begin to determine the nature and extent of needed rehabilitation services.

The history and physical should cover the following areas:

- Risk of Complications (skin breakdown, risk for DVT, swallowing problems, bowel and bladder dysfunction, malnutrition, falls, and pain) (see Annotations B and G)
- Determination of Impairment (Swallowing, Cognition, Communication, Motor, Psychological, and Safety Awareness) (see Annotation H and S)
- Psychosocial assessment (Family and Caregivers, Social Support, Financial, and Cultural Support) (see Annotation I)
- Assessment of prior and current functional status (e.g., FIM™) (see Annotation J)

### G. ASSESS RISK FOR COMPLICATIONS

#### **G-1 Assessment of Swallowing (Dysphagia)**

Dysphagia, an abnormality in swallowing fluids or food, is common; it occurs in about 45 percent of all stroke patients admitted to the hospital. It can seriously affect the patient's quality of life and potentially lead to death. It is associated with severe strokes, and with worse outcome. The presence of aspiration may be associated with an increased risk of developing pneumonia after stroke. Malnutrition is also common, being present in about 15 percent of all patients admitted to the hospital, and increasing to about 30 percent over the first week



post-stroke. Malnutrition is associated with a worse outcome and a slower rate of recovery.

Assessment of dysphagia by personnel who are not adequately trained in the anatomy and physiology of swallowing is oftentimes problematic. Traditionally, speech and language pathologists (SLPs) receive formal training in the oropharyngeal anatomy and physiology. However, many medical centers may not have the availability of the SLP, but may have other health professionals (e.g., occupational therapists and nurses) with training in assessment and treatment of dysphagia. The availability of the SLP and education of other health professionals in dysphagia is essential to insure that the rates of malnutrition and aspiration pneumonia are kept to a minimum.

## RECOMMENDATIONS

1. Recommend that all patients have their swallow screened prior to initiating oral intake of fluids or food, utilizing a simple valid bedside testing protocol. **[R=B]**
2. Recommend that the swallow screening be performed by the SLP or other appropriately trained personnel, if the SLP is not available. **[R=I]**
3. If the patient's swallow screening is abnormal, a complete bedside swallow examination is recommended. The examination should be performed by the SLP, who will define swallow physiology and make recommendations regarding management and treatment. **[R=I]**
4. Recommend that all patients who have a positive bedside screening be tested using videofluoroscopic swallowing study (VFSS)/modified barium swallow. Patients with a high risk for aspiration and/or dysphagia (e.g., brainstem stroke, pseudobulbar palsy, and multiple strokes), regardless of screening results, should undergo VFSS. **[R=B]**
5. Consider fiberoptic endoscopic examination of swallowing (FEES) as an alternative to VFSS **[R=C]**.
6. There is insufficient evidence to recommend for or against fiberoptic endoscopic examination of swallowing with sensory testing (FEESST) for the assessment of dysphagia. **[R=I]**
7. Recommend that the diagnostic assessment, whether VFSS or another modality, include a definition of

swallow physiology with identification of the physiologic abnormality and treatment strategies to directly assess their effectiveness. **[R=B]**

8. Consider addressing food consistency with dietetics to ensure standardization, consistency, and palatability.

## G-2 Treatment of Bowel and Bladder Incontinence

Urinary incontinence is a common problem after stroke. Approximately 50 percent of stroke patients have incontinence during their acute admission for stroke. However, that number decreases to 20 percent by six months post-stroke. Increased age, increased stroke severity, the presence of diabetes, and the occurrence of other disabling diseases increase the risk of urinary incontinence in stroke.

Most patients with moderate to severe stroke are incontinent at presentation, and many are discharged incontinent. Urinary and fecal incontinence are both common in the early stages. Incontinence is a major burden on caregivers once the patient is discharged home. Management of both bladder and bowel problems should be seen as an essential part of the patient's rehabilitation, as they can seriously hamper progress in other areas. Acute use of an indwelling catheter may facilitate management of fluids, prevent urinary retention, and reduce skin breakdown in patients with stroke; however, use of a foley catheter greater than 48 hours post-stroke increases the risk of urinary tract infection.

Fecal incontinence occurs in a substantial proportion of patients after a stroke, but clears within two weeks in the majority of patients. Continued fecal incontinence signals a poor prognosis. Diarrhea, when it occurs, may be due to medications, initiation of tube feedings, or infections. It can be due to leakage around a fecal impaction. Treatment should be cause specific.

Constipation and fecal impaction are more common after stroke than incontinence. Immobility and inactivity, inadequate fluid or food intake, depression or anxiety, a neurogenic bowel or the inability to perceive bowel signals, lack of transfer ability, and cognitive deficits may each contribute to this problem. Goals of management are to ensure adequate intake of fluid, bulk, and fiber and to help the patient establish a regular toileting schedule. Bowel training is more effective if the schedule is consistent with the patient's previous



bowel habits. Stool softeners and judicious use of laxatives may be helpful.

#### RECOMMENDATIONS

1. Recommend the assessment of bladder function in acute stroke patients, as indicated. Assessment should include **[R=B/C]**:
  - Assessment of urinary retention through the use of a bladder scanner or an in-and-out catheterization
  - Measurement of urinary frequency, volume, and control
  - Presence of dysuria
2. Consider removal of the foley catheter within 48 hours to avoid increased risk of urinary tract infection; however, if used, it should be removed as soon as possible. **[R=B]**
3. Recommend the use of silver alloy-coated urinary catheters, if a catheter is required. **[R=B]**
4. There is insufficient evidence to recommend for or against the use of urodynamics over other methods of assessing bladder function. **[R=I]**
5. Consider an individualized bladder training program be developed and implemented for patients who are incontinent of urine. **[R=C]**
6. Recommend that use of prompted voiding in stroke patients with urinary incontinence. **[R=B]**
7. Recommend a bowel management program be implemented in patients with persistent constipation or bowel incontinence. **[R=I]**

#### G-3 Assessment of Malnutrition

Adequate nutrition and hydration can be compromised by altered consciousness, swallowing difficulties (dysphagia), sensory or perceptual deficits, reduced mobility, or depression, which can cause decreased interest in eating. Assessment of nutrition and hydration includes monitoring intake, body weight, urinary and fecal outputs, caloric counts, and levels of serum proteins, electrolytes and blood counts.

#### RECOMMENDATIONS

1. Recommend that all patients receive evaluation of nutrition and hydration, as soon as possible after admission. **[R=I]** Food and fluid intake should be monitored daily in all patients and body weight should be determined regularly.
2. Recommend that a variety of methods be used to maintain and improve intake of food and fluids. **[R=I]** This will require treating the specific problems that interfere with intake, providing assistance in feeding, if needed, consistently offering fluid by mouth to dysphagic patients, and catering to the patient's food preferences. If intake is not maintained, feeding by a feeding gastrostomy may be necessary.

#### G-4 Assessment and Treatment of Pain

Patients may have pre-existing pain or acute pain post-stroke. Pain occurring post-stroke may include joint pain from spasticity, immobility, muscle weakness, headache, centrally mediated pain, and shoulder pain. Prevention, assessment, and treatment of pain should continue throughout rehabilitation care.

#### RECOMMENDATIONS

1. Recommend pain assessment using the 0 to 10 scale. **[R=I]**
2. Recommend a pain management plan that includes assessment of the following: likely etiology (i.e., musculoskeletal and neuropathic), pain location, quality, quantity, duration, intensity, and what aggravates or relieves the pain.
3. Control pain that interferes with therapy.
4. Recommend the use of lower doses of centrally-acting analgesics, which may cause confusion and deterioration of cognitive performance and interfere with the rehabilitation process.

#### H. ASSESSMENT OF COGNITION AND COMMUNICATION

Assessment of cognition and arousal is important for determining the patient's capabilities and limitations for coping with the stroke and assuring success of the rehabilitation process. The results of the assessment may impact the choice of treatment and disposition.

Assessment of communication ability is important for determining the patient's capabilities and limitations for expressing his/her wants and needs, understanding and contributing to his/her plan of care (including consent forms and advanced directives), and comprehending instructions affecting the success of the rehabilitation process. The results of the assessment may impact the choice of treatment and disposition.

## RECOMMENDATIONS

1. Assessment of cognition, arousal, and attention should address the following areas: learning and memory, visual neglect, attention, apraxia, and problem solving.
2. The Working Group does not recommend for or against the use of any specific tools to assess cognition. Several screening and assessment tools exist.
3. Assessment of communication ability should address the following areas: listening, speaking, reading, writing, and pragmatics.
4. The Working Group does not recommend for or against the use of any specific tools to assess communication. Several screening and assessment tools exist. Appendix B in the full guideline includes standard instruments for assessment of communication.

## I. PSYCHOSOCIAL ASSESSMENT

A comprehensive understanding and involvement of the whole person, family/caregiver, and environmental system are required for stroke rehabilitation. Without adequate resources and support it is difficult for patients to sustain the gains made during inpatient care or make further progress in the community. It is essential that the treatment team know the patient (including history, expectations, coping style, resources and emotional support system) in order to fully engage him/her in the treatment process. Motivation and hope for improvement is a critical factor in functional improvement.

## RECOMMENDATIONS

1. Recommend that all stroke patients should receive a psychosocial assessment, psychosocial intervention, and referrals. **[R=B]**

2. Recommend that families, significant others, and caregivers should be included in the assessment process. **[R=B]**
3. Recommend that all stroke patients should be referred to a social worker for a comprehensive psychosocial assessment and intervention. **[R=I]**
4. The psychosocial assessment should include the following areas:
  - History of pre-stroke functioning (e.g., demographic information, past physical conditions and response to treatment, substance use and abuse, psychiatric, emotional and mental status and history, education and employment, military, legal, and coping strategies)
  - Family/caregiver situation and relationships
  - Resources (e.g., income and benefits, housing, and social network)
  - Spiritual and cultural activities
  - Leisure time and preferred activities
  - Patient/family/caregiver understanding of the condition, treatment, and prognosis, as well as hopes and expectations for care

## J. ASSESSMENT OF FUNCTION

Analysis of function focuses on the measurement of task specific activities that are essential to support the well-being of an individual. The assessment of function is accomplished via a test or battery of tests in which the results can be used as (1) an information base for setting realistic goals, (2) an indicator to the patient of current abilities that documents progression toward more complex functional levels, (3) an index for decisions on admission and discharge from a rehabilitation or extended care facility, and (4) a guide for determining the safety of an individual in performing a particular task and the risk of injury with continued performance. The discharge environment must support the functional abilities of the patient.

## RECOMMENDATIONS

1. Recommend that a standardized assessment tool be used to assess functional status of stroke patients. **[R=B]**

2. Consider the use of the Functional Independence Measure (FIM™) as the standardized functional assessment (see Appendix D – Functional Independence Measure [FIM™] Instrument in the full guideline).

Appendix B in the full guideline includes the list of other standard instruments for assessment of function and impact of stroke.

## **K. DOES PATIENT NEED REHABILITATION INTERVENTIONS?**

Patients who have sustained an acute stroke should receive rehabilitation services if their post-stroke functional status is below their pre-stroke status, and if there is a potential for improvement. If pre- and post-stroke functional status is equivalent, or if the prognosis is judged to be poor, rehabilitation services may not be appropriate for the patient at the present time.

Patients who have had an ischemic or hemorrhagic stroke with resulting impairments and limitations in activities, as identified on the brief assessment, should be referred to rehabilitation services for an assessment of rehabilitation needs.

### **RECOMMENDATIONS**

1. Strongly recommend that once the patient is medically stable, the primary physician consult rehabilitation services (i.e., physical therapy, occupational therapy, speech and language pathology, kinesiotherapy, and Physical Medicine), as indicated, to assess the patient's rehabilitation needs and to recommend the most appropriate setting to meet those needs.
2. A multidisciplinary assessment, using a standard procedure, should be undertaken and documented for all patients. Patients with need of rehabilitation intervention should be referred to a specialist stroke rehabilitation team, as soon as possible.

## **L. IS INPATIENT REHABILITATION INDICATED?**

No study has demonstrated the superiority of one type of rehabilitation setting over another. The decision to provide rehabilitation services in an inpatient setting, either in the general inpatient ward, rehabilitation unit, or long term care unit, is based on the patient's needs and availability of resources. Regardless of the setting, the patient should be cared for by a coordinated team.

### **RECOMMENDATIONS**

1. Strongly recommend that patients in need of rehabilitation services have access to a coordinated and organized rehabilitative team, experienced in providing stroke services. The coordination and organization of post-acute stroke care will improve patient outcome. **[R=A]**
2. No conclusive evidence was found to demonstrate the superiority of one type of rehabilitation setting over another. **[R=B]**
3. The severity of the patient's impairment, the availability of family/social support, and patient/family preferences will determine the optimal environment for care. **[R=I]**
4. Recommend that patients remain in an inpatient setting for their rehabilitation care if they are in need of skilled nursing services, regular physician care, and multiple therapeutic interventions. **[R=I]**

## **M. IS PATIENT INDEPENDENT IN ADL AND IADL?**

Instrumental activities of daily living (IADL) are skills beyond basic self-care skills needed to function independently at home and in the community. Successful performance of complex activities of daily living (ADL) tasks (i.e., cooking, cleaning, shopping, and house-keeping) requires higher-level neurophysiological organization than is required for performance of self-maintenance tasks (i.e., bathing and dressing). For a patient planning to return to an assisted living situation, further

independence may not be required or expected. For many patients, however, IADL are central to independent living. Cognitive functioning and comprehension are also factors for independent living.

RECOMMENDATIONS

1. Recommend that all post-stroke patients should be reassessed for ADL prior to discharge. [R=B]
2. Recommend that all patients planning to return to independent community living should be assessed for IADL prior to discharge (including a community skills evaluation and home assessment). [R=B]
3. Minimal IADL skills required to stay at home alone include the ability to: (1) prepare or retrieve a simple meal, (2) employ safety precautions and exhibit good judgment, (3) take medication, and (4) get emergency aid, if needed. Refer to Table 1 in the full guideline as a guide to differentiate between ADL and IADL.

Table 2: ADL and IADL	
Activities of Daily Living (ADL)	Instrumental Activities of Daily Living (IADL)
<b>Mobility</b> Bed mobility Wheelchair mobility Transfers Ambulation Stair climbing	<b>Home Management</b> Shopping Meal planning Meal preparation Cleaning Laundry Child care
<b>Self-Care</b> Dressing Self-feeding Toileting Bathing Grooming	<b>Community Living Skills</b> Money/financial management Use of public transportation Driving Shopping Access to recreation activities
<b>Communication</b> Writing Typing/computer use Telephoning Use of special communication devices	<b>Health Management</b> Handling medication Knowing health risks Making medical appointments
<b>Environmental Hardware</b> Keys Faucets Light switches Windows/doors	<b>Safety Management</b> Fire safety awareness Ability to call 911 Response to smoke detector Identification of dangerous situations

Modified from: Pedretti LW. Occupational Therapy: Practice Skills for Physical Dysfunction. 4th ed. St. Louis: Mosby; 1996.

## **N. DISCHARGE PATIENT TO PRIOR HOME/COMMUNITY; ARRANGE FOR MEDICAL FOLLOW-UP IN PRIMARY CARE**

### **RECOMMENDATIONS**

1. Strongly recommend that every patient participate in a secondary prevention program (see Annotation D). **[R=A]**
2. Recommend that post-acute stroke patients be followed up by a primary care provider to address stroke risk factors and continue treatment of comorbidities.
3. Recommend that the patient and family/caregiver be educated regarding pertinent risk factors for stroke.

### **N-1 Exercise Program**

#### **RECOMMENDATIONS**

1. Recommend that the patient participates in a regular strengthening and aerobic exercise program at home or in an appropriate community program that is designed with consideration of the patient's comorbidities and functional limitations. **[R=B]**

### **N-2 Adaptive Equipment, Durable Medical Devices, Orthotics, and Wheelchairs**

Many patients require assistive devices, adaptive equipment, mobility aids, wheelchairs, and orthoses to maximize independent functioning following stroke. Many types of adaptive devices and durable medical devices (DME) are available. Type and level of functional deficit, degree of achieved adaptation, and the structural characteristics of the living environment determine the need for a particular item.

#### **RECOMMENDATIONS**

1. Recommend that adaptive devices be used for safety and function if other methods of performing the task are not available or cannot be learned or if the patient's safety is a concern. **[R=C]**
2. Recommend that lower extremity orthotic devices be considered, if ankle or knee stabilization is needed to improve the patient's gait and prevent falls. **[R=C]**
3. Recommend that a prefabricated brace be initially used and only patients who demonstrate long-term need for bracing have customized orthoses made. **[R=C]**

4. Recommend that wheelchair prescriptions be based on careful assessment of the patient and the environment in which the wheelchair will be used. **[R=C]**
5. Recommend that walking assistive devices be used to help with mobility efficiency and safety, when needed.

### **N-3 Return to Work**

The AHCPR (1995) states, "Stroke survivors who worked prior to their strokes should, if their condition permits, be encouraged to be evaluated for the potential to return to work. Vocational counseling should be offered when appropriate." A meeting report by the American Stroke Association's 26th International Stroke Conference stated, "...the risk of stroke increases dramatically with age and the average age of workers is increasing." Because of Social Security Administration's change in mandatory retirement age "...more people will be working at the time of stroke and as more treatments are developed, more survivors will be facing the possibility of re-employment."

#### **RECOMMENDATIONS**

1. Recommend that all patients, if their condition permits, should be encouraged to be evaluated for the potential of returning to work. **[R=C]**
2. Recommend that all patients who were previously employed be referred to vocational counseling for assistance in returning to work. **[R=C]**
3. Recommend that all patients who are considering a return to work, but who may have psychosocial barriers (e.g. motivation, emotional, and psychological concerns) be referred for supportive services, such as vocational counseling or psychological services. **[R=C]**

### **N-4 Return to Driving**

The question of *if* or *when* a person can resume driving after a stroke can be difficult to answer. The family and medical staff will need to balance the patient's desire for independence with safety concerns. Safe operation of a vehicle requires multi-level functions (e.g., physical, cognitive, psycho-motor, perceptual-motor, and behavioral). Legal requirements vary from state to state.



## RECOMMENDATIONS

1. Recommend that all patients be given a clinical assessment of their physical, cognitive, and behavioral functions to determine their readiness to resume driving. In individual cases, where concerns are identified by the family or medical staff, the patient should be required to pass the state road test as administered by the licensing department. Each medical facility should be familiar with their state laws regarding driving after a stroke. [R=I]
2. Consider referring patients with residual deficits to adaptive driving instruction programs to minimize the deficits, eliminate safety concerns, and ensure that patients will be able to pass the state driving test. [R=I]

### N-5 Sexual Function

Sexual issues relate both to sexual function and to changes in body image as a result of the stroke. Sexual activity usually diminishes and sometimes ceases after stroke, but sex remains an important issue to the majority of post-stroke patients. Sexual issues are often not adequately addressed, despite evidence that patients and their partners welcome frank discussions.

## RECOMMENDATIONS

1. Sexual issues should be discussed during rehabilitation and addressed again after transition to the community when the post-stroke patient and partner are ready.

### O. PATIENT WITH SEVERE STROKE AND/OR MAXIMUM DEPENDENCE AND POOR PROGNOSIS FOR FUNCTIONAL RECOVERY

Patients who have had a severe stroke or who are maximally dependent in ADL and have a poor prognosis for functional recovery are not candidates for rehabilitation intervention. Families and caregivers should be educated in the care of these patients. The family and caregiver education may include preventing recurrent stroke; signs and symptoms of potential complications and psychological dysfunction; medication administration; assisted ADL tasks (e.g., transfers, bathing, positioning, dressing, feeding, toileting, and grooming); swallowing techniques; nutrition and hydration; care of an indwelling bladder catheter; skin care; contractures;

use of a feeding tube; home exercises (range of motion); and sexual functioning. Families should receive counseling on the benefits of nursing home placement long-term care.

### P. POST-STROKE PATIENT IN INPATIENT REHABILITATION

*Inpatient rehabilitation* is defined as rehabilitation performed during an inpatient stay in a freestanding rehabilitation hospital or a rehabilitation unit of an acute care hospital. The term *inpatient* is also used to refer generically to programs where the patient is in residence during treatment, whether in an acute care hospital, a rehabilitation hospital, or a nursing facility.

### Q. DETERMINE LEVEL OF CARE

The clinician determines the optimal environment in which inpatient rehabilitation services should be provided. Outcomes are better with the presence of a coordinated team specializing in stroke rehabilitation. The primary determinants of the level of care should be the patient's medical and functional status (i.e., motor and cognition). The decision should be made in the context of social support and access to care.

## RECOMMENDATIONS

1. Strongly recommend that rehabilitation services be provided in an environment with organized and coordinated post-acute rehabilitation care. [R=A]

### R. EDUCATE PATIENT/FAMILY; REACH SHARED DECISION REGARDING REHABILITATION PROGRAM; DETERMINE TREATMENT PLAN

Goals are central to the process of rehabilitation because rehabilitation involves behavioral change. The use of patient goals that transcend treating disciplines is a common method of creating consistency in the delivery of rehabilitation services; however, not all rehabilitation settings subscribe to their use. The setting of goals is a mechanism for active patient involvement and cooperation of the patient into the "rehabilitation team." Goal setting should use both short-term and long-term perspectives.



## RECOMMENDATIONS

1. Recommend that the rehabilitation team and family/caregiver should reach a shared decision regarding the rehabilitation program.
  - The rehabilitation team proposes the preferred environment for rehabilitation and treatments based on expectations for recovery.
  - The rehabilitation team describes to the patient and family/caregiver the treatment options, including the rehabilitation and recovery process, prognosis, estimated length of stay, frequency of therapy, and discharge criteria.
  - The patient, family/caregiver, and rehabilitation team should determine the optimal environment for rehabilitation and preferred treatment.
2. The rehabilitation program should be guided by specific goals developed in consensus with the patient, family, and rehabilitation team **[R=I]**.
3. Recommend that the patient's family/caregiver should participate in the rehabilitation sessions, and be trained to assist the patient with functional activities, when needed.
4. Patient and family/caregiver education should be provided in an interactive and written format **[R=B]**. Provide the patient and family/caregiver with an information packet that may include printed material on subjects such as the resumption of driving, patient rights/responsibilities, support group information, and audio/visual programs on stroke.
5. Document the detailed treatment plan in the patient's record to provide integrated rehabilitation care.

## S. INITIATE REHABILITATION PROGRAMS AND INTERVENTIONS

Patients who have had an ischemic or hemorrhagic stroke with resulting impairments and limitations in activities, as identified on the brief assessment, should be referred to rehabilitation services for an assessment of rehabilitation needs.

Stroke rehabilitation involves programs to reduce impairments, enhance recovery and adapt to the persisting disability. Adaptation to the disability includes programs to teach mobility, ADL, and community re-integration. These programs also include provision of

assistive devices and technology. Mobility and training in ADL have not been, nor are likely to be in the future, subjected to randomized controlled studies. The treatment plan involves a coordinated team that may include physical therapy, occupational therapy, speech and language pathology, kinesiotherapy, Physical Medicine or a stroke rehabilitation physician. The following recommendations address those areas in which high quality evidence has been identified.

### S-1 Dysphagia Treatment

Dysphagia treatment may involve compensatory strategies including posture changes, heightening sensory input, swallow maneuvers (voluntary control of selected aspects of the swallow), active exercise programs, or diet modifications. Dysphagia management may include non-oral feeding, psychological support, nursing intervention, etc. At this time, it is unclear how dysphagic patients should be fed and treated after acute stroke.

## RECOMMENDATIONS

1. Recommend considering enteral feeding for the stroke patient who is unable to orally maintain adequate nutrition or hydration. **[R=B]**
2. Consider the use of a feeding tube, however, there is no evidence to recommend the use of one feeding route over another.
3. Recommend that the dysphagic stroke patient receive both direct swallowing treatment and management by the speech and language pathologist (SLP), when available, when a treatable disorder in swallow anatomy or physiology is identified. **[R=B]**

### S-2 Acute Communication Disorders

Disorders of communication (i.e., problems with speaking, listening, reading, writing, gesturing, and/or pragmatics) and related cognitive impairments may occur in as many as 40 percent of post-stroke patients. The most common communication disorders occurring post-stroke are aphasia and dysarthria. Rapid spontaneous improvement is common, but early evaluation can identify communication problems and monitor change. If indicated, intervention can help maximize recovery of communication abilities and prevent learning of ineffective or inappropriate compensatory behaviors. Goals of speech and language treatment are to: (1) facilitate

the recovery of communication; (2) assist patients in developing strategies to compensate for communication disorders and (3) counsel and educate people in the patient's environment to facilitate communication, decrease isolation, and meet the patient's desires and needs.

## RECOMMENDATIONS

1. Recommend that patients with communication disorders receive early treatment and monitoring of change in communication abilities in order to optimize recovery of communication skills, develop useful compensatory strategies, when needed, and facilitate improvements in functional communication. [R=B]
2. Recommend that the SLP educate the rehabilitation staff and family/caregivers in techniques to enhance communication with patients who have communication disorders. [R=I]

### S-3 Long-Term Communication Difficulties

Disorders of communication (i.e., problems with speaking, listening, reading, writing, gesturing, and/or pragmatics) and related cognitive impairments may occur in as many as 40 percent of post-stroke patients. The most common communication disorders occurring post-stroke are aphasia and dysarthria. Rate of improvement decreases with time post-stroke, making the evaluation and, if indicated, treatment of residual communication disorders an important step towards achieving independence and improving quality of life for stroke patients. Goals of speech-language treatment are to: 1) facilitate the recovery of the communication difficulties; 2) assist patients in developing strategies to compensate for communication disorders; and 3) counsel and educate people in the patient's environment to facilitate communication, decrease isolation, and meet the patient's wants and needs.

## RECOMMENDATIONS

1. Strongly recommend that all patients should be evaluated and treated by the SLP for residual communication difficulties (i.e., speaking, listening, reading, writing, and pragmatics). [R=A]

### S-4 Motor Functioning - Strengthening

Muscle weakness is a common impairment following stroke. However, facilitation treatment models have often emphasized the management of spasticity without addressing underlying muscle weakness. Another common intervention focus is functional training; sometimes without addressing the contributing impairments. Lower extremity muscle strength has been correlated with gait speed in stroke patients. Additionally, lower extremity muscle strength on admission to rehabilitation is a predictor of function at discharge. Lower extremity strength has also been inversely correlated with risk of falling in elderly individuals.

## RECOMMENDATIONS

1. Recommend that strengthening be included in the acute rehabilitation of patients with muscle weakness following stroke. [R=I]

### S-5 Partial Body Weight Support for Treadmill Training

More than one-half of stroke patients who survive the acute phase of stroke are not able to walk and will require a period of rehabilitation to achieve a functional level of ambulation. Recent studies report that the type of training strategy implemented in rehabilitation can affect the patient's locomotor recovery. A recently proposed gait training strategy involves unloading the lower extremities by supporting a percentage of body weight. Body weight support provides symmetrical removal of weight from the lower extremities, thereby facilitating walking in patients with neurological conditions. This specific gait training strategy has been used to enhance/facilitate locomotor abilities after stroke.

## RECOMMENDATIONS

1. Recommend that treadmill training with partial body weight support be used as an adjunct to conventional therapy in patients with mild to moderate dysfunction resulting in impaired gait. [R=B]

### S-6 Constraint Induced (CI) Movement Therapy

Substantial loss of motor function may persist after sustaining a stroke. Persistent loss of upper extremity function is common among these individuals. Several different therapeutic approaches aimed at resolving upper extremity dysfunction following stroke have been

postulated. One such approach has been termed constraint induced (CI) movement therapy, and involves forced use of the involved upper extremity and discourages the use of the unaffected extremity. This approach requires substantial exercises (e.g., 6 to 8 hours a day for 2 weeks).

## RECOMMENDATIONS

1. Consider the use of constraint induced (CI) therapy for a select group of patients – that is, patients with 20 degrees of wrist extension and 10 degrees of finger extension, who have no sensory and cognitive deficits. To date the only demonstrated benefit occurs in individuals who received 6 to 8 hours of daily training for at least 2 weeks. [R=C]

### S-7 Functional Electrical Stimulation (FES)

Functional electrical stimulation (FES) is electrical stimulation applied to a muscle, causing it to contract. FES has been used for several years as a therapy modality for post-stroke patients, but has not been a routine standard of care. FES is a time limited intervention, generally used during the first several weeks after the acute stroke.

## RECOMMENDATIONS

1. Recommend treatment with FES for patients who have demonstrated impaired muscle contraction, specifically with patients with ankle/knee/wrist motor impairment. [R=B]
2. Recommend FES for patients who have shoulder subluxation. [R=B]
3. There is insufficient evidence to recommend for or against using multi-channel FES for severe hemiplegic patients with gait impairment. [R=B]
4. Recommend FES for gait training following stroke. [R=B]

### S-8 Neuro Developmental Training for Motor Retraining

Several theoretical models of motor behavior exist. These models serve as the foundation for treatment approaches for central nervous system (CNS) dysfunction. Traditional approaches to CNS dysfunction are based on reflex or hierarchical models of motor control. These models of motor control have influenced neuro developmental training (NDT). NDT approaches focus on a progression of movement through the devel-

opmental sequence, inhibition of primitive reflexes/spasticity, and facilitation of higher-level control. In the NDT model of motor control, higher centers control lower centers in the CNS.

On the contrary, contemporary models of motor control and learning focus on the interaction of higher and lower centers of control and view the nervous system as one system among many that influence motor behavior. Contemporary task oriented approaches focus on the interaction of multiple systems and assume that motor control and behavior are organized around goal directed and functional activities, rather than on muscles or movement patterns.

## RECOMMENDATIONS

1. There is insufficient evidence to recommend for or against using NDT in comparison to other treatment approaches for motor retraining following an acute stroke. [R=I]

### S-9 Spasticity

Contractures that restrict movement of the involved joint or are painful will impede rehabilitation and may limit a patient's potential for recovery. Patients with paretic limbs with muscle spasticity are at high risk of developing contractures. Early treatment is key to preventing this disabling complication.

## RECOMMENDATIONS

1. Recommend that spasticity and contractures be treated with antispastic positioning, range of motion exercises, stretching, splinting, serial casting, or surgical correction. [R=C]
2. Consider use of tizanidine, dantrolene, and/or oral baclofen for spasticity resulting in pain, poor skin hygiene, or decreased function. Tizanidine should be used specifically for chronic stroke patients (refer to Annotation S-15). [R=B]
3. Recommend *against* diazepam or other benzodiazepines during the stroke recovery period due to possible deleterious effects on recovery (refer to Annotation S-15), in addition to deleterious sedation side effects. [R=D]
4. Consider use of botulinum toxin or phenol/alcohol for selected patients with disabling or painful spasticity

or spasticity resulting in poor skin hygiene or decreased function. [R=B]

5. Consider intrathecal baclofen for chronic stroke patients for spasticity resulting in pain, poor skin hygiene, or decreased function. [R=C]
6. Consider neurosurgical procedures, such as selective dorsal rhizotomy or dorsal root entry zone lesion, for spasticity resulting in pain, poor skin hygiene, or decreased function. [R=I]

### S-10 Biofeedback

Surface and computerized electromyographic (EMG) biofeedback have been used and documented in the treatment of stroke patients since the 1970s for improvement of arm function, gait, and swallowing. Biofeedback has been used primarily as an adjunct to conventional therapies.

#### RECOMMENDATIONS

1. The Working Group makes no recommendation for or against routine use of biofeedback for post-stroke patients. The use of biofeedback is left to the consideration of the individual provider. [R=C]

### S-11 Shoulder Pain

Shoulder pain resulting from sensori-motor dysfunction of the upper extremity is a common problem following stroke. As many as 72 percent of stroke patients will experience at least one episode of shoulder pain during the first year following the stroke. Shoulder pain can delay rehabilitation and functional recuperation, as the painful joint may mask improvement of motor function or may inhibit rehabilitation because it limits the use of a cane or wheelchair for ambulation. The incidence of shoulder-hand-pain syndrome has been reported to be as high as 67 percent in patients with a combination of motor, sensory, and visuoperceptual deficits.

#### RECOMMENDATIONS

1. Consider the following interventions to prevent shoulder pain in the involved upper extremity, following a stroke:
  - Electrical stimulation to improve shoulder lateral rotation [R=B]
  - Shoulder strapping (sling) [R=B]
  - Staff education to prevent trauma to the hemiplegic shoulder

2. Recommend avoiding the use of overhead pulleys which encourage uncontrolled abduction. [R=D]

3. Consider the following interventions to treat shoulder pain:

- Intra-articular injections (Triamcinolone) [R=B]
- Shoulder strapping [R=C]
- Improve range of motion (ROM) through stretching and mobilization techniques focusing especially on external rotation and abduction, as a means of preventing frozen shoulder and shoulder-hand-pain syndrome [R=B]
- Modalities: ice, heat, and soft tissue massage
- Functional electrical stimulation (FES)
- Strengthening

### S-12 Cognitive Remediation

Impairments in cognitive functioning are common following a stroke. In particular, impairments in attention, memory, and executive functioning (i.e., integrating multiple and complex processes) can be especially disabling. The treatment of cognitive deficits through cognitive remediation designed to reduce deficits can be approached in a variety of ways. Cicerone and colleagues completed a comprehensive review of the evidence-based literature for cognitive remediation for both traumatic brain injury (TBI) and stroke. The review revealed a large number of RCTs in a variety of areas of cognitive functioning and provided comprehensive guidelines for cognitive rehabilitation specific to these populations. There is support for cognitive remediation of deficits in both the acute and post-acute phases of recovery from stroke and TBI, although some of the improvements were relatively small and task specific. Some benefits were specific to the TBI population, although it seems reasonable to extend some of these results to the stroke population.

#### RECOMMENDATIONS

1. Recommend that patients be assessed for cognitive deficits and be given cognitive re-training, if any of the following conditions are present:
  - Attention deficits [R=A]
  - Visual neglect [R=B]
  - Memory deficits
  - Executive function and problem-solving difficulties [R=C]



2. Patients with multiple areas of cognitive impairment may benefit from a variety of cognitive re-training approaches that may involve multiple disciplines. [R=I]
3. Recommend the use of training to develop compensatory strategies for memory deficits in post-stroke patients who have mild short term memory deficits. [R=B]

### **S-13 Mood Disturbance: Depression and Emotionalism**

#### **Assessment:**

All patients should be screened for emotional disorders given the high incidence following a stroke. Post-stroke depression often manifests with subtle signs, such as refusal to participate in therapy. High index of suspicion is necessary in order to recognize depression before it interferes too much with therapy and with the patient's well-being. The assessment of the post-stroke patient can be complicated by cognitive deficits that prevent the patient from recognizing or being able to report symptoms of depression. The patient may present with flat affect or aprosodic speech caused by organic changes related to stroke that may be misinterpreted as sadness or indifference to their situation. In addition, the aphasic patient with receptive and/or expressive language difficulties poses a unique challenge for the diagnostician. There is not a single, universally accepted tool for the assessment of post-stroke depression (PSD). In fact, most screening instruments used to assess depression were not established for patients with cognitive and/or physical impairments.

Various studies have used different criteria for the diagnosis of PSD. Given the limitations of the research and the problems unique to this patient population, assessment that involves a variety of information from multiple sources may be most beneficial. Therefore, a psychiatric illness may be best diagnosed using a clearly delineated criteria for major depression, as well as other categories of psychiatric symptoms (e.g., mania and anxiety) along with patient self-report, observation of patient behavior, information from family members familiar with the patient's premorbid condition, and staff reports of changes in behavior, motivation, effort, and emotional reactivity.

#### **Treatment:**

A variety of neuropsychiatric sequelae can be seen following a stroke, with depressive symptoms being most common. In fact, PSD is estimated to occur in between 25 to 75 percent of post-stroke patients (depending upon diagnostic criteria utilized) and is under diagnosed by nonpsychiatric physicians. PSD is frequently untreated because the neurovegetative symptoms of depression, including sleep disturbance, decreased appetite, fatigue, and feelings of hopelessness, are similar to common post-stroke symptoms. Speech and cognitive difficulties can also make the assessment of PSD very difficult. Because the consequences of depression can impact a patient's ability to actively participate in therapies and lengthen recovery, it is important to address the symptoms early on in the rehabilitation process. Literature suggests that PSD is treatable with a variety of medications, with selective serotonin reuptake inhibitors (SSRI) and tricyclic antidepressants being the most frequently studied medications. Although the literature regarding the efficacy of individual psychotherapy during rehabilitation is limited, there are some studies that suggest adaptations of cognitive-behavioral therapy techniques and brief supportive therapy may be beneficial.

It is extremely common for post-stroke patients to experience periods of emotionalism. The symptoms generally decline over time with no need for treatment with medication or therapeutic intervention. This is mistakenly interpreted by many family and staff as depression. Although these symptoms are frequently unrelated to mood, they can be a cause for frustration and concern for the patient and family. However, as many as 15 percent of patients experience a more extreme form of emotional change referred to as "pathological affect" or "pseudo-bulbar affect" (uncontrollable laughing/crying), and if not treated, can develop into clinical depression. Therefore, patient and family education is very important. When this lability interferes with the patient's rehabilitation or complicates the patient's relationship with family members, pharmacotherapy may be considered. These extreme symptoms have also been found to respond to antidepressant medication.

Depression frequently co-exists with other psychiatric syndromes and “the presence of depressive symptoms should lead to consideration of other types of mood disturbance.” Anxiety in particular is found to co-exist with depression in the post-stroke patient population, but frequently goes undiagnosed. Anxiety can create uncomfortable or disabling feelings of worry/fear accompanied by physical symptoms that make participation in therapy more difficult. Shimoda and Robinson reported that generalized anxiety disorder (GAD) accompanied by PSD delayed recovery from depression, delayed ADL recovery, and reduced overall social functioning. Unfortunately, few studies have been conducted to address the treatment and recovery from post-stroke GAD.

## RECOMMENDATIONS

### Assessment

1. The Working Group makes no recommendation for the use of one specific diagnostic tool over another.
2. Recommend using a structured inventory to assess specific psychiatric symptoms and monitor symptom change over time (refer to the VA/DoD Guideline for Management of Major Depressive Disorder).
3. Recommend assessing post-stroke patients for other psychiatric illnesses, including anxiety, bipolar illness, and pathological affect.

### Treatment

4. Strongly recommend that patients with a diagnosed depressive disorder be given a trial of antidepressant medication, if no contraindication exists. **[R=A]**
5. The Working Group makes no recommendation for the use of one class of antidepressants over another; however, side effect profiles suggest that SSRIs may be favored in this patient population.
6. Recommend that patients with severe, persistent or troublesome tearfulness be given a trial on antidepressant medications. **[R=A]**
7. Strongly recommend SSRIs as the antidepressant of choice in patients with severe, persistent, or troublesome tearfulness.
8. There is insufficient evidence to recommend for or against the use of individual psychotherapy alone in the treatment of post-stroke depression. **[R=C]**

9. Recommend that patients be given information, advice, and the opportunity to talk about the impact of the illness upon their lives. **[R=B]**
10. Routine use of prophylactic antidepressants is not recommended in post-stroke patients. **[R=D]**
11. Recommend that mood disorders causing persistent distress or worsening disability be managed by or with the advice of an experienced clinical psychologist or psychiatrist.

## S-14 Visual and Spatial Neglect

A multitude of stroke presentations with various combinations of visual-perceptual impairments are seen in the post-stroke population. When present, visual and spatial neglect can have a substantial negative impact on an individual's ability to function safely within his or her environment and is a significant contributor to poor prognosis after stroke. Unilateral neglect is the lack of awareness of a specific body part or external environment contralateral to the site of the brain lesion and usually occurs in patients with right (nondominant) cortical strokes. Unilateral body neglect may occur independently of visual field cuts or visual inattention or be compounded by these deficits. Testing and observation by a trained professional is necessary to recognize neglect and to distinguish it from visual field cuts, impaired attention, planning or visuospatial abilities, thereby allowing the professional to properly treat the deficit.

It is important to note that with neglect, the patient does not realize that he/she is failing to attend to one side of their world. Because of safety concerns related to this, such as the risk of sustaining burns or injury to the affected limb, neglect should be addressed early in the rehabilitation process. The clinician may observe neglect when a patient dons his/her shirt on only one arm, shaves only half of his face or fails to notice food on half of his/her lunch tray. Reading, writing, drawing and mobility may also be negatively impacted by the presence of neglect.

Many patients with mild neglect have spontaneous improvements of their symptoms within weeks of onset. Those with profound neglect may improve over a period of many months. The literature does not reveal a single intervention best suited for addressing neglect. A multifaceted approach can be helpful. Patient education is an



important element within these interventions. Patient education is often a long-term process, and the goal is to teach the patient to acknowledge the neglect (to some degree).

## RECOMMENDATIONS

1. Recommend that stroke patients be assessed for visual and spatial neglect, as indicated. [R=C]
2. Recommend that treatment for stroke patients with visual/spatial neglect focuses on functional adaptation (e.g., visual scanning, environmental adaptation, environmental cues, and patient/family education). [R=B]

### S-15 Use of Pharmacologic Agents

While undergoing rehabilitation for stroke, patients frequently receive a variety of medications to treat complications of stroke or other unrelated chronic medical conditions. While many of these concomitant medications cross the blood-brain barrier and have central nervous system effects, relatively little is known about the potentially deleterious or beneficial effects of these drugs on stroke recovery. Providers often do not consider their potential impact on stroke outcomes. Limited data exist for certain pharmaceutical agents regarding beneficial or deleterious influences on recovery from stroke, but further study is needed before definitive recommendations can be made.

## RECOMMENDATIONS

1. Recommend against the use of neuroleptics, benzodiazepines, phenobarbital, and phenytoin during the stroke recovery period. These pharmaceutical agents should be used cautiously in stroke patients, weighing the likely benefit of these drugs against the potential for adverse effects on patient outcome. [R=D]
2. Recommend against centrally acting  $\alpha_2$ -adrenergic receptor agonists (such as clonidine and others) and  $\alpha_1$ -receptor antagonists (such as prazosin and others) as antihypertensive medications for stroke patients because of their potential to impair recovery (see Annotation D). [R=D]
3. There is insufficient evidence regarding optimal dose and safety use of neurotransmitter-releasing agents

and central nervous system stimulants. Consider stimulants/neurotransmitter-releasing agents in selected patients to improve participation in stroke rehabilitation or to enhance motor recovery.

Dextroamphetamine has been the most tested stimulant at 10 mg per day, but insufficient evidence is available regarding optimal dosing and safety to support the routine use of CNS stimulants during rehabilitation. Data remains sparse to consider routine use of neurotransmitter-releasing agents in stroke recovery. [R=B]

## T. IS PATIENT READY FOR COMMUNITY LIVING?

The majority of patients who have had a stroke will be managed initially in a hospital. The time of discharge from inpatient care to home (or to residential living or nursing home) constitutes an important watershed. There is much anecdotal and some research-based evidence that discharge could be better managed. Living with disabilities after a stroke is a lifelong challenge during which people continue to seek and find ways to compensate for or adapt to persisting neurological deficits. For many stroke patients and their families, the real work of recovery begins after formal rehabilitation.

## RECOMMENDATIONS

1. Recommend that the patient and family/caregivers are fully informed about, prepared for, and involved in all aspects of healthcare and safety needs. [R=I]
2. Recommend that the family/caregivers receive all necessary equipment and training in moving and handling, in order to position and transfer the patient safely in the home environment. [R=I]
3. Recommend that the patient have appropriate vocational and income support opportunities. Stroke patients who worked prior to their strokes should be encouraged to be evaluated for the potential to return to work, if their condition permits. Vocational counseling should be offered when appropriate. [R=I]
4. Recommend that leisure activities should be identified and encouraged and the patient enabled to participate in these activities. [R=C]

5. Recommend that case management be put in place for complex patient and family situations. [R=C]
6. Recommend that acute care hospitals and rehabilitation facilities maintain up-to-date inventories of community resources, provide this information to stroke patients and their families and caregivers, and offer assistance in obtaining needed services. [R=C] Patients should be given information about, and offered contact with, appropriate local statutory and voluntary agencies.

**U. ADDRESS ADHERENCE TO TREATMENTS AND BARRIERS TO IMPROVEMENT:  
IF MEDICALLY UNSTABLE, REFER TO  
ACUTE SERVICES  
IF THERE ARE MENTAL HEALTH FACTORS,  
REFER TO MENTAL HEALTH SERVICES**

During the rehabilitation process, patients will occasionally come up against unexpected barriers to their continued progress or to their ability to adhere to the treatment plan. These include medical complications and mental health factors that make it difficult to participate/adhere to treatment goals. Lack of or incorrect information about diagnosis, prognosis, treatment rationale, and need for behavioral change may also become barriers to improvement.

Most times, this assessment and treatment can occur in the rehabilitation setting and will not require a transfer to another service. Once the barriers have been successfully addressed, re-examination of treatment goals may be helpful.

- When the encountered barrier is medical illness that makes participation difficult, referral to the appropriate service for treatment is warranted.
- When the issue is related to mental health factors, assessment of these factors by a psychiatrist/psychologist and intervention/treatment is appropriate.

**V. DOES PATIENT NEED COMMUNITY-BASED REHABILITATION SERVICES?**

**Nursing facility rehabilitation:**

Rehabilitation performed during a stay in a nursing facility. Nursing facilities vary widely in their rehabilitation capabilities, ranging from maintenance care to comprehensive and intense rehabilitation programs.

**Outpatient rehabilitation:**

Rehabilitation performed in an outpatient facility that is either freestanding or attached to an acute care or rehabilitation hospital. Day hospital care is a subset of outpatient rehabilitation in which the patient spends a major part of the day in an outpatient rehabilitation facility.

**Home-based rehabilitation:**

A rehabilitation program provided in the patient's place of residence.

**W. DETERMINE OPTIMAL ENVIRONMENT FOR COMMUNITY-BASED REHABILITATION SERVICES**

Patients referred for outpatient or home care services are those who have rehabilitation needs but do not meet the criteria for continued inpatient stay. These patients do not have skilled nursing needs or require regular physician contact; however, they may have multiple therapy needs. Outpatient rehabilitation can occur in different settings, including the patient's home.

**RECOMMENDATIONS**

1. Strongly recommend continuing outpatient rehabilitation services in the setting where they can most appropriately and effectively be carried out. This is based on medical status, function, social support, and access to care. [R=A]